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New host records of *Nerocila poruvae* (Isopoda: Cymothoidae) from the Northern part of the east coast of India and first report of a fish - *Ablennes hians* (Valenciennes, 1846) from West Bengal coast

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The Cymothoid parasitic isopod *Nerocila poruvae* and host fishes were collected from Northern east coast of India (West Bengal and Odisha) and reported for the first time parasitizing on five new host species such as, *Siganus canaliculatus*, *Setapinna taty*, *Ablennes hians*, *Pampus argentus* and *Rhynchorhamphus georgii*. The fish host *Ablennes hians* is reported for the first time from West Bengal coast. Number of infested fish, percentage of prevalence, numbers of parasites and their average was calculated and reported. Further, the attachments sites of parasites on host body were also recorded.

[**Keywords**: Cymothoidae, Ecto-parasite, Odisha, Prevalence, West Bengal]

Introduction

The family Cymothoidae belongs to the suborder Cymothoida is a blood feeder, protandrous hermaphrodite and obligate fish parasites of all oceans except polar waters; infest on different parts of body surface, buccal cavity and gill chamber of their hosts[1-5]. In the juvenile stage Cymothoid isopods are normally pelagic[6] and the adults are normally either parasitic or commensal found attached to their hosts. This family is mostly marine in habitat and sometimes found in freshwaters particularly in Africa and Asia; some are also found in Latin American river but greatest diversity is found in tropical marine waters. These parasites are mostly found attached to their host within 200 m depth, and about 10 species recorded to live in more than 500 m depth. Their life cycle is holoxenic and completes on a single host. Majority of Cymothoidae are highly site specific and host specific[4-5,7].

The genus *Nerocila* (family Cymothoidae) represents about 65 parasitic species living attached to the host fishes. The family Cymothoidae, at present, worldwide comprises of 383 species under 40 genera[5] and around 56 species of them were reported from Indian coastal water[8-10]. Most of the marine Cymothidae species were reported from southern part of east coast of India and very few on northern parts of east coast and west coast of India. Members of Cymothoid cause large amount of economic losses by infesting commercially important fishes and gradually killing them by destroying host respiratory surface, inhibiting growth, preventing development of buccal structure, causing reproductive disorder and anemia to host fishes. They also kill small fishes and fingerlings by directly damaging the tissues. Sometimes, isopod infection also leads to secondary microbial infection[11-14].

Host specificity is the main fundamental properties and important life history traits of any parasite. Host specificity also gives an idea of how they invade in new habitat and new geographical area[15-16]. Thus, studies pertaining to host specificity of isopods with fishes are very essential for biological and economical point of view. In view of this, the objective of present study is to document new host range of *N. purovae* infestation in some marine fish species namely, *Siganus canaliculatus*, *Setapinna taty*, *Ablennes hians*, *Pampus argentus* and *Rhynchorhamphus georgii*.

Materials and Methods

The fish specimens were collected from two different fish landing centers of West Bengal and Odisha coast during post-monsoon season from September 2012 to December 2014. After collection, photographs were taken in fresh and isopods were collected from the host body surface and were preserved in 70 % ethanol. The isopods were examined, using Leica-EZ4 microscope. The parasites were identified according to standard literatures[9,17-23]. The voucher specimens are deposited in the Museum of Marine Aquarium and Regional Center, Zoological Survey of India, Digha, West Bengal (Registration No. MARC/ZSI/A3970; collection of Dipanjan Ray). Host fish identifications are done according to standard literatures[24-28]. The sampling locations, date, host species name, attachment site, measurement (mm) of isopod and host fishes were recorded and are presented in Table 1. The prevalence and intensity were calculated as per Margolis *et al*.[29] and are presented in Table 2.

Results

Altogether, fourteen *Nerocila poruvae* specimens were collected from West Bengal and Odisha coast. Eleven of them were collected from body surface of five different host fishes and 3 were collected without host. *Nerocila poruvae* is first time reported from Odisha coast. Five new hosts were recorded for *N. poruvae* during the present study. Taxonomic details, identifying characters of isopod, hosts details and parasitological indices are presented in Table 1. Total prevalence of *N. poruvae* was 4.87; the prevalence was high on *Ablennes hians* (11.11 %) and low on *Pampus argenteus* (1.63 %). Total intensity was 1.27; highest on *Ablennes hians*, *Papmus argenteus* and *Rhynchorhamphus georgii* (14), and lowest on *Setapinna taty* (2.33; Table 2).

Material examined

One specimen of *Siganus canaliculatus* (182 mm SL) were parasitized by single specimen of *N. poruvae* (22.6 mm TL) from Paradip (Odisha) and another specimen of *S. canaliculatus* (145 mm SL) were parasitized by single specimen of *N. poruvae* (20.3 mm TL) from Digha (West Bengal) coast. Six specimens of *Setipinna taty* (79 – 93 mm SL) were parasitized one on each by *N. poruvae* (20 – 24.2 mm TL) from Digha. A single specimen of *Ablennes hians* (463 mm SL) was parasitized by a single *N. poruvae* (22.8 mm TL) from Digha coast. One specimen of *Rhynchorhamphus georgii* (267 mm SL) was parasitized by a single *N. poruvae* (20.6 mm TL) from Digha coast. One specimen of *Pampus argenteus* (91 mm SL) was parasitized by a single *N. poruvae* (21.1 mm TL) from Digha coast. Two specimens of *N. poruvae* (18.2 – 21.5 mm TL) were collected from Paradip (Odisha) and one (19.5 mm TL) from Digha coast which were found without host. The photographs of parasites along with their hosts are given in Figure 1.

Table 1 — The host family, species, attachment site, locality of specimen and number specimens examined

Host family	Host species	Attachment sites	Locality	No. of specimen
Siganidae	*Siganus canaliculatus*	Lower part of body: Caudal peduncle, between lateral line and dorsal fin base.	Digha and Paradip	2
Engraulidae	*Setipinna taty*	Upper part of body: Dorsal part of pectoral fin base, below the operculum.	Digha	6
Belonidae	*Ablennes hians*	Lower part of body: Between soft dorsal rays and lateral line.	Digha	1
Hemirhamphidae	*Rhynchorhamphus georgii*	Lower part of body: Below soft dorsal fin base and above the lateral line.	Digha	1
Stromateidae	*Pampus argenteus*	Upper part of body: Below operculum and upper part of pectoral fin base.	Digha	1

Table 2 — Comparison of randomly selected uninfected, infected specimens, parasite host prevalence and intensity index

Host	No. of examined fish	No. of infected fish	Prevalence	Intensity*
Siganus canaliculatus	41	2	4.87	7 (14)
Setapinna taty	69	6	8.69	2.33 (14)
Ablennes hians	9	1	11.11	14 (14)
Pampus argenteus	61	1	1.63	14 (14)
Rhynchorhamphus georgii	14	1	7.14	14 (14)

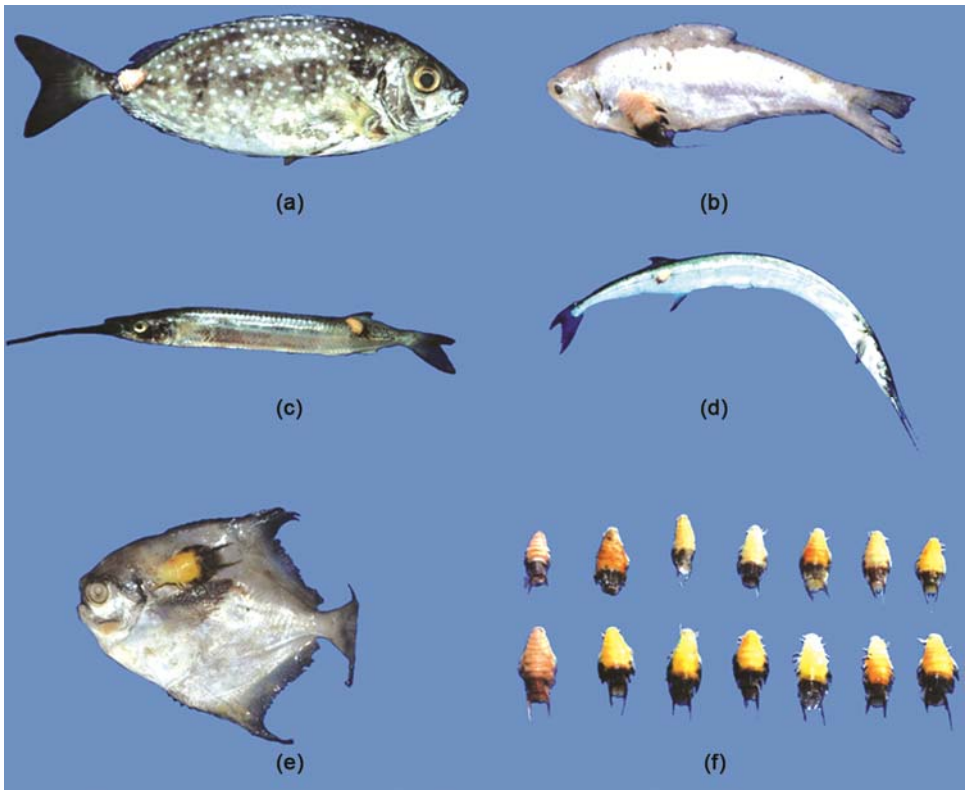

Fig. 1 — *Nerocila purovae* with host a) *Siganus canaliculatus*; b) *Setipinna taty*; c) *Rhynchorhamphus georgii*; d) *Ablennes hians*; e) *Pampus argenteus* and f) different view of *Nerocila purovae.*

Taxonomical characterization of parasitic isopod

Nerocila poruvae body nearly 2.5 times long in comparison to its width. Pereonites 4-7 widest; 1 and 5-7 longest; and 2-4 are shortest and subequal. Pleonites 1-5 widest and pleonite 5 is longest. Antennula 8 articled extending to pereonite 1; and antenna with 11 articles. Mandibular palp article 1 largest; maxilla is with 2 spines on medial lobe and single spine on lateral lobe. Pereopods 1-5 without spines, and 6-7 is with spines. Pleopods 1-2 with rami lamellar, and pleopods 3-4 endopod is with a single lobe, pleopod 5 endopod with large folds. Uropod slender, ramis extends well beyond pleotelson. Body pale yellowish to white up to coxae 6-7; lower part of perionite 7, all pleonites, anterior part of pleotelson and uropods black.

Morphometry of *Ablennes hians* (Valenciennes, 1846)

D: 0, 25; A: 0, 27; P: 15; V: 6. Pectoral fin fulcate. Body dark bluish dorsally and silvery white ventrally with 14 vertical black bars on body (Fig.1d). This fish species is reported here as a new record to West Bengal coast.

Discussion

In the current study, *Nerocila poruvae* was observed attached on the body of *Siganus canaliculatus*, *Setipinna taty*, *Ablennes hians*, *Pampus argenteus* and *Rhynchorhamphus georgii* from the West Bengal and Odisha coast. The genus *Nerocila* comprises about 65 species which uses fish body surface as host[9]. Along the Indian coast 12 valid member of genus *Nerocila* are reported[4]. *Nerocila purovae* is a new member which was discovered by Rameshkumar *et al*.[23] from Vedaranyam coast, Tamil Nadu. The holotype parasitized on *Thryssa mystax* and the paratype parasitized on *Trichurus lepturus*. After that Dev Roy *et al*. [30] reported *N. poruvae* from Bakkhali and Digha (West Bengal) which have parasitized on *Setipinna tenuifilis*. Present study added five new hosts for *N. poruvae* as well as first time report *N. purovae* from Odisha coast. Previously reported host species *Setipinna tenuifilis* differ from congeneric new host species *Setipinna taty* by having low total belly scutes count (25-27 in *Setipinna tenuifilis*; and 33-39 in *Setipinna taty*) and smaller filamentous pectoral fin ray (filamentous pectoral fin longer in *Setipinna taty*). Except, *Siganus*

canaliculatus other three hosts are commercially important and edible, but, *Siganus canaliculatus* have ornamental value, do well in aquarium; so, all the five hosts are economically valuable. The infected fishes were lighter than normal healthy fish, indicating the effect of parasites on the host body. In this study, *N. poruvae* was most frequently reported along the upper pectoral fin and caudal fin area. The position of attachment might be dependent on the host's movement. During the study it was observed that all the *N. poruvae* were found during the post-monsoon season which is also a peak collection time for all the host species except *Ablennes hians* in northern part of the east coast of India. Marine fish association with parasitic isopod is very scanty in northern east coast. Hence, this investigation provides very important information on host range and distribution of marine parasitic Cymothoid isopod in Indian coastal waters. All potential marine fishing zone regions should note the presence of large numbers of this cymothoid isopod *Nerocila* species. With this study, the paper reports this widespread isopod parasite *N. poruvae* from West Bengal and Odisha coast that affects the productivity of a commercial and ornamental fish species.

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Conflict of Interest

No conflict of Interest

Author Contributions

DR: Collection, preservation, Identification of specimens & MS preparation

SM: Identification of parasites and contributed towards MS preparation

SB: MS preparation and conformation of parasite

AM: Host Identification, Concept and designing of MS

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